

How *Psychrobacter* 273-4 survives in the permafrost: a proteomic perspective

Suping Zheng
Chemistry Department
University of Michigan
930 N. University Ave.
USA
zhengs@umich.edu

Monica A. Ponder
Center for genomic research on low temperature organisms
Michigan State University
USA

James Tiedje
Center for genomic research on low temperature organisms
Michigan State University
USA

David M. Lubman
Chemistry Department
University of Michigan
USA

Psychrobacter 273-4 was isolated from a 20-40 thousand-year-old Siberian permafrost core, which is characterized by low temperature, low water activity and higher salt concentration. To explore how 273-4 survives in the permafrost environment, the proteome of four 273-4 samples cultured under 4 C and 22C, treated or untreated with 5% sodium chloride were comparatively studied using two dimensional HPLC and mass spectrometry method. The samples untreated with 5% sodium chloride were more sensitive to the temperature change than the samples treated with 5% sodium chloride, and the samples cultured under 22 C were more sensitive to the 5% sodium chloride treatment compared to the samples cultured under 4C. In addition, 5% sodium chloride treatment and 4C showed a combination effect on the samples. More than 50 proteins involved in temperature and salt regulation were identified using mass spectrometry and database searching. 26% of proteins identified were hypothetical and conserved hypothetical proteins and 24% of proteins were translation related proteins. Most of proteins identified were down regulated or up regulated across samples. Some proteins have been reported in some other bacterial temperature related studies, such as HSP60 and DnaK proteins.